Chapter 9 SCHEMATIC DESIGN

A. General

This chapter outlines the requirements of the Schematic Design (35%) Submittal. This submittal will be presented as a single narrative/ graphic report and consists of a narrative, drawings, outline specifications, and a cost estimate. This chapter defines, by discipline, the specific requirements of the submittal.

B. Objective

The schematic submittal shall be of sufficient detail to:

- show the user how the functional and technical needs will be met
- indicate the designer's approach to the solution of technical aspects to all reviewers
- show compliance to the criteria or justification for non-compliance
- provide a valid estimate of construction cost.

The submittal must be heavily oriented toward creating the proper architectural treatment and establishing the design of the basic structural, mechanical, and electrical systems, and in general, show the FD&CC that the project has been sufficiently thought out and adequate site investigations have been completed to enable it to proceed with no major changes in design.

C. Deviations

All deviations from applicable criterion such as Coast Guard construction criteria, building code, fire protection, life safety, OSHA, and the safety manual, shall be summarized and enumerated in the design analysis. Identify the deviation, citing source and paragraph, criteria requirements and the nature of the deviation, followed by an authority granting waiver and date. If waiver has not been granted, indicate NONE.

D. Submittal Requirements

The schematic submittal will consist of an 8-1/2"x11" bound volume and 22"x34" bound drawing set. The number of copies will be as indicated in the project SOW. The submittal will include the following elements.

E. Drawings (All Disciplines)

The design drawings shall cover all aspects of the project design. Minimum drawing submission requirements, by discipline, are contained in Table 8 (series).

F. Narrative/Basis of Design (All Disciplines)

Minimum requirements for the Narrative/Basis of Design and calculations, by discipline, are contained in Table 9 (series).

G. Outline Specifications (All Disciplines)

Outline specifications shall be submitted by all disciplines. See Appendix D for more information.

H. Cost Estimate

When required by the SOW, a Level 2 estimate reflecting the level of detail consistent with 35 percent submittal shall be provided. Guidance for preparation of the Level 2 estimate is provided in Appendix E.

Table 9.1 Civil Design
Schematic Submittal Requirements

Narrative/Basis of Design	
Site Development:	Describe the site of the project, its natural advantages and disadvantages relative to the proposed project, natural vegetation, trees and topography which can be utilized in the enhancement of the completed facility. Outline the proposed landscaping and other site work necessary to complete the site development. Include physical security requirements and considerations.
Roads, Driveways, Parking Areas, Walks:	Provide the following information: a. A statement of general soil conditions, with a brief outline of soil exploration and testing performed. b. The type and volume of traffic, controlling wheel loads and types and/or classes of roads under consideration.
Water Supply:	Provide the following information: a. Explanation of existing system, covering the type, capacity, condition, present water use and unsatisfactory elements of component parts for major extensions. b. Statement of type of construction and materials for mains. c. For distribution systems, statement of design, domestic and fire flow, residual pressure, and elevation differentials (should include designer's estimate of pipe sizes). d. Statement of sizes, elevations, capacities, etc., as can readily be determined without long computations or design consideration for reservoirs, treatment units, pumping plants, well pumps, and such units.
Sewers and Sewage Disposal Systems:	Provide the following information: a. Explanation of existing system covering, in particular, the type, capacity, condition, present flow, and unsatisfactory elements of component parts for major extensions. b. Interpretation of degree of treatment necessary by effluent requirements and units necessary for treatment. c. Statement of materials to be used for sewer systems and sewage treatment plants.
Fencing:	Describe type, height, clear zones, and justification for new fencing. Describe height and type of existing fence on or adjacent to the project site. Include a description of any special phasing required to maintain security during removal and installation of fencing.
Environmental Pollution Control:	A statement explaining expected environmental pollution and the proposed method of control. A detailed description will be necessary for those facilities directly related to controlling air and water pollution; such as sewage treatment plants, industrial treatment facilities, incinerators, smoke elimination facilities and other similar projects.
Storm Drainage:	A statement of the requirements for storm water management for the particular state in which the project is located (i.e. on site detention/point source discharge). Explanation of the design approach to be taken, including materials selection.
Environmental Site Issues:	A statement explaining known and potential site environmental issues such as wetlands, shoreline or drainage issues requiring special permitting.
Demolition:	A statement discussing proposed demolition of existing structures, suspected or tested hazardous materials, and special disposal requirements.

Table 9.1 (Continued)	***Civil Design Schematic Submittal Requirements***

Drawings	
Location Plan:	Show project location in relation to ***MAJOR*** landmarks or features of the installation. Also show the proximity to related facilities which influence project operations. Use insets with an overall view of the station to show widely separated but related facilities. The General Location Plan shall include as much of the activity as necessary to convey meaningful information to someone who has not visited the facility. Show haul routes, borrow areas, disposal areas, laydown and storage areas and plant sites. This drawing may also serve as a cover sheet and should include a vicinity map. An Index of Drawings is required and may be shown on this drawing.
Site Plan:	This plan should show all new aboveground site features, complete with dimensions, traffic flow patterns, parking layout, striping, and handicapped parking requirements. Location of new facilities should be referenced to existing, identifiable surface features or survey control points.
Existing Site and Demolition Plan:	Provide a complete and accurate map of the site, drawn to an appropriate scale, showing existing contours and spot elevations, as well as all topographic features. All bench mark control points, markers or monuments shall be clearly referenced and described. The survey shall show locations of borings and shall be oriented so that North is to the top or to the left of the sheet. The plan shall be provided with graphic scales, keymaps, north arrow, datum plane and station coordinates of bench marks, and legend to define all symbols used. All demolition should be shown on this drawing and indicated by legend. Demolished features should ***NOT*** be shown on subsequent drawings. The new facility should be outlined (by broken line) at the proper location on this sheet. Indicate any areas of site contamination.
Utilities Plan:	This plan should show all existing and new water and sewer lines with sizes indicated. The water system should include the approximate elevation of the existing lines and the location of all valves and hydrants. The sewer system should include the location of manholes and pump stations, the inverts and top elevations of all manholes and cleanouts, and slopes of lines. Rough details of pump stations, and other special structures should be provided. Show storm drainage lines; include line sizes and material types, slopes and appurtenances. New and existing mechanical and electrical utilities should also be shown on this plan.
Grading and Storm Drainage Plan:	This plan includes all existing and finish contours at maximum 1.0 foot intervals, existing and finish spot elevations as necessary to ensure proper drainage, ditches, existing and new storm drainage pipes with sizes and slopes shown, manholes, catch basins, curb inlets, headwalls, and other necessary structures. Clearly indicate locations of security barriers on man passable pipes and ditches which pass under security fences.
Soil Boring Logs:	Logs should be referenced to the boring number in the plan sheet where shown. Soils should be identified in accordance with the Unified Soil Classification System. Standard penetration test blow counts and ground water table elevations shall be shown. Soil boring log elevations shall be referenced to true bench mark elevations shown on grading plan, and a note on the sheet shall indicate when and by whom the borings were taken. The drawing(s) should be complete at the 35% stage.
Other Drawings:	Prepare additional drawings, as required, to convey the scope and features of the project.

Calculations	
Design Calculations:	The calculations shall support the plans and specifications. Complete calculations shall be submitted for all design features. All references, codes and design data used in the calculations shall be included and source indicated in the calculations.

Table 9.1 (Continued)	***Civil Design Schematic Submittal Requirements***
Computer outputs:	Shall be identified similar to the calculations and may be referenced as an appendix or attachment

Specifications	
Outline Specifications:	Outline specifications shall be developed per Appendix D.

Table 9.2 Architectural Design
Schematic Submittal Requirements

Narrative/Basis of Design	
Introduction:	Briefly describe the purpose of this project and extent of construction. Include and refer to supporting Appendices at the end of the Basis of Design that should include original scope of work and design conference minutes.
Architectural Compatibility:	Briefly describe architectural style of buildings in the immediate vicinity of the site and other installation/base buildings having functions similar to the facility being designed. Discuss the approach to achieving architectural compatibility with nearby facilities (both existing and future construction). Identify design changes made in response to previous review comments.
Type of Construction:	Describe type of construction chosen with reference to anticipated building life and degree of combustibility.
Building Insulation:	Describe types of insulation to be provided with specific R-values for roof(s), walls, floor(s), etc.
Materials and Finishes;	Describe materials for all major items of construction including interior/exterior finishes.
Physical and Electronic Security:	Describe requirements including listed criteria defining those requirements. Address design features proposed for use in the construction.
Furniture, Fixtures and Equipment List:	List the furniture and furnishings. Identify furnishings that will be included in the construction contract such as systems furniture, fixed seating and all other elements (bulletin boards, marker boards, lockers etc.). Include costs for all furniture/furnishings/equipment to be procured to support the project.
Space Programming:	Provide the following: a. Gross area calculation. b. A *room by room* tabulation including: 1. Net area for each room indicating both the programmed area and the area as designed (include notes to justify spaces greater than 10% above or below the programmed NSF area. 2. Verify that room size is adequate for built-in and loose equipment and furniture and for the identified function. 3. Identify the personnel by function and grade.
Water and Moisture Proofing:	a. Identify roofing membrane material. If single ply, identify proposed generic type. b. Describe means for controlling water penetration and moisture migration through exterior walls. c. Describe typical roof and wall sections.
Hazardous Materials Abatement:	Identify abatement areas and quantities of asbestos, lead based paint, PCBs, mercury or other hazardous materials.
Recycled Materials:	Identify major areas for recycling of demolished material and incorporation of recycled products into the design.

Table 9.2 Continued	***Architectural Design Schematic Submittal Requirements***

Drawings	
Architectural Plans:	Drawings shall be developed to the extent indicated and drawn to scale (1/4" scale for small and 1/8" for large buildings) showing: a. Types of walls/partitions (secure area construction and acoustical and fire rating), door swings, door openings, windows, and stairs/steps/ramps with pertinent dimensions and notes. b. Rooms/spaces with names and numbers. Show furniture and furnishings on the "35% Generic Furniture Footprint": furniture that is to be included in the construction contract, loose conventional furniture and any large equipment provided by the customer should be included in the plan. c. Key Plan on each floor plan sheet when the floor plan is not contained on a single sheet. d. Enlarge plans at 1/2" scale for toilets, typical dormitory bedrooms, kitchens, stairs, etc. Include toilet partitions, handicapped accessible/ regular toilet fixtures/accessories/drinking fountains, and other provisions for handicapped. e. Area Tabulation Diagram with gross SF shown for each type of area f. Special Hazardous Areas (Battery charging areas, flammable storage, etc.)
Roof Plan:	May be drawn at smaller scale, showing slopes, internal drains or gutters, crickets, skylights, pipe penetrations, expansion joints, and roof-mounted (mech/elec/etc.) equipment.
Architectural Elevations:	Drawings shall be developed to the extent indicated and drawn to scale. a. Exterior finish material and color notations coordinated with "exterior finish material samples". b. Anticipated mechanical/electrical equipment, louvers and/or other penetrations. c. Downspouts, flashing, crack control joints, expansion joints, and brick coursing. d. Doors with frames and windows with frames, mullions, and operating sash. e. Exterior grade and floor elevation(s). f. Extent of new additions/alterations related to existing construction. g. Notes identifying special construction elements related to architectural compatibility or other requirements.
Building Sections:	Drawings shall be developed to the extent indicated and drawn to scale. a. Exterior wall type notations (cavity/ veneer)... do not draw wall construction in detail. b. Outline of interior spaces and exterior limits of walls, floors, roofs, and shading devices.
Exterior Wall Sections:	From foundation to roof membrane/parapet top for each type of exterior wall system. Show and label each material. Include "R-values" for wall and roof insulation.
Typical Interior Partition Sections:	Showing fire and acoustical ratings. Coordinate with floor plans.
Details:	Showing sufficient information to permit development of a reliable cost estimate. Include detail sections of typical roof at eaves or parapet conditions at 3" = 1'-0" scale.
Door, Window, and Louver Schedules:	Door, Window, and Louver Schedules - see Table 11.2.
Finish, Color, and Signage Schedules:	Interior Finish, Color, and Signage Schedules -- see Table 11.2.

Table 9.2 (Continued)	***Architectural Design Schematic Submittal Requirements***
Furniture Plans:	Generic Furniture Footprint drawn to the facility design scale is necessary to ensure that each space has been sized and configured appropriately.

Miscellaneous	
Architectural Rendering:	If required by the SOW.
Architectural Model:	If required by the SOW.

Specifications	
Outline Specifications:	Outline specifications shall be developed per Appendix D.

Table 9.3 Structural Design
Schematic Submittal Requirements

Narrative/Basis of Design	
Introduction:	The Basis of Design shall justify the foundation and structural systems to be used. A brief synopsis shall be included to identify the logical alternatives for structural consideration and to discuss the rationale used to determine the best foundation and structural systems. Attention shall be given to factors such as criteria, cost, local conditions, construction schedule and methods, availability of materials/skilled labor, etc.
Description of the foundation:	The description of the foundation shall include the subsurface conditions, the method of analysis and design, and the allowable capacity and time/settlement curves for any differential/uniform settlement expected.
Description of the structural system:	The description of the structural system shall include the type of construction, method of analysis and design, all significant design criteria and loads, and all special features to be included on the drawings. Discussion of potential impact to adjacent structures (from piling, excavation, etc.), recommend mitigation and/or monitoring methods.

Drawings	
Foundation Plan:	Foundation plan at the same scale as the architectural plans to show the general sizes, location and arrangement of all significant features of the foundation system. Include the layout of all slabs, footings, piers, grade beams, piles, caissons, pile/caisson caps, trenches, pits, openings, depressed and thickened slabs, etc. showing all dimensions and elevations necessary for construction. All dimensions shall be referenced to a column-line grid system oriented about the axes, usually length and width, of the structure and along the center-lines of the major support columns and walls. Elevations may be given using any datum consistent throughout the structural drawings so long as the chosen datum is referenced to the true elevation. Special construction features, sequencing and site conditions such as de-watering, excavation bracing, underpinning, expansive soils, existing structures, etc. which have a significant impact on project cost shall be shown.
Framing Plans:	Framing plans, consistent with the foundation plan, to show general sizes, location and arrangement of all significant features of the horizontal framing system. Include the layout of all beams, joists, stringers, purlins, slabs, decks, plates, grating, etc. showing all dimensions and elevations necessary for construction. The elevations shall be referenced to some finished datum such as top of steel, slab, finished floor, concrete, joist, deck, etc. Special construction features, sequencing and site conditions which have a significant impact on project cost shall be shown.
Elevations:	Elevations, if necessary, consistent with the foundation plans to show general sizes, location and arrangement of all significant features of the vertical framing system. Include the layout of all columns, walls, beams, girts, stringers, bracing, etc. showing all dimensions and elevations necessary for construction. Reference elevations shall be consistent with the framing plans.
Sections and Details:	Sections and Details shall provide sufficient information to identify the general types of material and methods of construction required such that a reliable cost estimate can be developed for the structure. All parts or pieces shall be identified and shown in sufficient detail to provide an accurate representation of their size, connections and spatial relationships to other structural/architectural features. All dimension and elevation references shall be consistent with previous plans.

Table 9.3 (Continued)	***Structural Design Schematic Submittal Requirements***

Calculations	
General:	The analysis and design of all structures and components shall be done in accordance with the criteria applicable to the project. The calculations shall be legible, orderly and easily understandable. At the schematic submittal the calculations should be complete for all major cost contributing components.
Cover Sheet:	Cover Sheet shall include the project title, location, construction contract number and the names of the persons originating and checking the calculations. The person checking the calculations shall be a registered engineer practicing structural engineering and shall be a different engineer from the originator.
Index:	Index shall include a table of contents showing the subject and page number for each topic (introduction, design criteria, calculations) and subtopic (loads, materials, references, wind analysis, footing design, wall design, column design, etc.) addressed in the calculations. Each page, consecutively numbered, shall identify the total number of pages contained in the calculations (sheet __ of __), the revision number, date, project name, project location and be initialed by the originator and the checker.
Introduction:	Introduction shall include a brief statement describing the structural system, significant design parameters and any restrictions that may affect the project design.
Design Criteria:	Design Criteria shall be provided and shall include the following: **Loads** - Include all loadings, forces, temperature changes, induced settlements, etc. that may affect the design. The list shall include the application/location, magnitude and units of measure for each load. **Restrictions** - Include all limiting factors such as deflection limits, (horizontal and vertical), height restrictions, special tolerances for installing or operating equipment, or other special restrictions that may affect the design of the structure. **Materials** - Include all materials to be used and their allowable stress limits or yield points. The list shall include material type and grade, class, allowable stress, yield and appropriate units of measure. **References** - Include all criteria, accepted standards, manuals, codes, texts, papers, or other design information used in the analysis and design that is accepted in a public domain. All references shall be appropriately identified.
Calculations:	Calculations shall include the analyses and designs of all (major cost contributing elements) beams, columns, walls, foundations, slabs, bracing, diaphragms, equipment supports, etc. and the connections to each other to provide a safe, stable, efficient and cost effective structural system. An adequate number of sketches with sufficient detail to make the designer's intentions clear, concise and easily understandable shall be provided. All assumptions, code references, standards, criteria, drawings and computer outputs shall be noted as necessary.
Computer Outputs:	Computer Outputs shall be identified similar to the calculations and may be referenced as an appendix or attachment. Document the program name, source and version. All models used for computer input shall be provided. The models shall show nodes/joint, element/members, materials/properties, and all loadings, temperature changes, induced settlements/deflections, etc., and a list of their combinations considered in the analysis. Computer results shall include an output summary listing for maximum/minimum stresses/forces and deflections for each element and the structure reactions for each loading combination.

Specifications	
Outline Specifications:	Outline specifications shall be developed per Appendix D.

Table 9.4 Mechanical Design
Schematic Submittal Requirements

Narrative/Basis of Design	
Introduction:	The Basis of Design shall be a narrative presentation of facts that will clearly indicate the selected mechanical/plumbing systems and/or the proposed alternative systems to be analyzed.
Plumbing Systems:	A discussion and description shall be provided for: a. Number and types of plumbing fixtures b. Selection of piping materials c. Estimated maximum and minimum water pressure d. Availability/capacity of system connected into.
Heating, Ventilation, and Air Conditioning:	A discussion and description shall be provided for: a. Calculated heating and cooling loads b. Documentation of unusual temperature and humidity requirements c. Ventilation rates with a statement regarding compliance with ASHRAE Standard 62 d. Discussion of areas to be conditioned and equipment locations/space requirements e. Documentation of customer's preference for the HVAC control system f. Information on available energy sources/utilities, such as natural gas, steam from central heating plant, chilled water from central chiller plant, etc. g. For projects requiring an energy analysis, list alternative systems to be analyzed with a brief statement as to why each system is justified for further analysis. h. Any other HVAC design features such as industrial ventilation requirements, provisions for future heating/cooling plant additions, etc. i. Description of the selected HVAC systems and controls, including energy sources. j. Special HVAC requirements (hazardous areas such as welding hoods, dip tanks, etc.)
Refrigeration (Cold Storage):	Refrigeration (Cold Storage): Describe refrigeration/cold storage requirements, proposed equipment, vapor barrier types of refrigerants, etc.
Fuel Distribution and Storage:	Bulk and Ready Issue Petroleum Fuel Distribution and Storage: Discuss storage, distribution, leak detection, containment, overfill protection etc.
Energy Conservation::	A discussion and description of proposed systems to manage energy consumption.
Miscellaneous Mechanical Systems:	Miscellaneous Mechanical Systems: Describe any special mechanical systems.

Drawings	
General:	Mechanical floor plans shall be not less than 1/8"=1'-0". Floor plan scales of 1/4"=1'-0" should be considered when the complexity of the work results in overcrowding of the drawings such as in mechanical room layout and in the design of clinics.

Table 9.4 (Continued)	***Mechanical Design Schematic Submittal Requirements***
Drawings:	HVAC Floor Plans showing the location of major equipment and ductwork. All ductwork shall be shown double line, to scale. a. Plumbing Floor Plans showing potable water, DWV, compressed air, etc. b. Basic HVAC system and riser diagrams. c. HVAC and plumbing equipment schedules, showing sizes of major equipment. d. HVAC Design Conditions Schedule including tolerances of inside temperatures and relative humidities. e. Basic HVAC control diagrams and written sequence of control. f. Site layout showing points of utility connections, including sewer invert elevations at the five foot line. g. Exterior piping including chilled/hot water, condenser water, plumbing/ sanitary, steam, fuel, compressed air and gas piping, etc. h. Equipment locations. i. Fuel storage general arrangement.

Calculations	
General:	Air conditioning and heating calculations shall be in accordance with the latest edition of ASHRAE guidance. At a minimum, calculations shall include: a. Source documentation for all design values used. b. Tabulation of inside and outside design temperatures and relative humidities. Include tolerance values for inside conditions. c. Building section sketches (i.e. roof, ceiling, and walls) showing U-value calculations d. HVAC calculations including tabulation of process/electronic loads e. Psychometric plots showing all state points for each air handling unit. f. Plumbing calculations including water heating and storage requirements. g. Compressed air and industrial gases including demand tabulation. h. Pump head calculations. Rule of thumb estimates for fitting losses are not acceptable. i. Manufacturer's catalogue cuts documenting equipment selection points.

Specifications	
Outline Specifications:	Outline specifications shall be developed per Appendix D.

Table 9.5 Fire Protection Design Schematic Submittal Requirements

Narrative/Basis of Design	
Introduction:	Include the type of occupancy per Life Safety Code, NFPA-101, and if sprinkler protection will be provided. Prior to the design of any structure, specific questions regarding fire protection must be raised in order to address the occupants' particular needs and acceptable levels of fire risk as avenues of egress and fire rated separations are all basic to the floor plan. It is essential that any answers about fire protection be reached as early as possible.
Type of Construction:	Clearly identify and describe the type of construction to be used as defined by the Uniform Building Code detailing the maximum fire area and separation of structures. Submit occupant loading and exiting calculations conforming to the NFPA 101 (Life Safety Code).
Fire Extinguishing System:	Identify the fire extinguishing system to be provided detailing design parameters and area to be protected listing criteria references. The specific hazard to be protected (i.e. light ordinary, extra, etc.) must be clearly outlined in addition to the density provided over the desired operating area. Calculations showing that water flow is adequate to meet sprinkler demands are required which necessitates a field survey by the A/E to determine actual water supply data. Design shall be in accordance with Mil-Handbook 1008-B and NFPA criteria as appropriate.
Fire Alarm and Detection Systems:	Clearly describe fire alarm and/or fire detection system to be provided. List all actuating and reporting devices and functions the system will perform including a sequence of operations. Identify, with special emphasis on the base wide fire reporting system (if applicable), any existing fire alarm equipment, annunciator locations, etc.

Drawings	
General:	Fire protection criteria are more frequently shown on the drawings of other disciplines except for more complex fire protection systems.
Civil Drawings:	These drawings should show all existing and new water lines. Particular attention shall be made to the location of existing and proposed fire hydrants to ensure compliance with Mil-Handbook-1008-B. Show required valves, point(s) of connection to sprinkler system supply lines.
Architectural Drawings:	Architectural drawings should show a general building layout with regard to life safety, as defined by the Life Safety Code, NFPA 101; and fire area separation as required by the UBC. Included in this design should be the location of exits, fire walls, corridors, stairwells, and any other required fire rated enclosure. The designer should anticipate the occupants' range of activities during a 24 hour day, 7 days week period to determine the required life safety needs of the occupant. It is critical that all life safety questions be answered early in the project because the floor plan is directly involved.
Mechanical Drawings:	Include the locations of any required fire or smoke dampers. locate the sprinkler riser on the plans; do not show the layout of the overhead sprinkler piping. clearly identify any areas to be protected by sprinklers, CO^2 or other automatic extinguishing system.

Table 9.5 (Continued)	***Fire Protection Design Schematic Submittal Requirements***

Electrical Drawings:	1) The electrical site plan should show the location of new exterior fire alarm reporting stations and the point of connection of new equipment to the base fire alarm system. 2) The electrical floor plan should show all fire alarm and detection devices. If an electrically controlled suppression system is utilized, show these devices on a separate floor plan. Includeall manual pull stations, automatic detectors, control panels, and audible alarms. show the location of exit lights and emergency lights. 3) show a fire alarm riser diagram which includes all fire alarm equipment and interconnections. Indicate the source of power supply and connection to base fire alarm system. 4) show a fire suppression system riser diagram which includes all devices.

Calculations	
General:	Provide water supply data and calculations verifying the availability of water for sprinkler systems. In addition, occupancy calculations are required in order to conform with NFPA 101, Life Safety Code. Provide quantity calculations for $C0_2$ and/or clean agent systems to size tanks and ensure adequate space is provided on the architectural plans.

Specifications	
Outline Specifications:	Outline specifications shall be developed per Appendix D.

Table 9.6 Electrical Design
Schematic Submittal Requirements

Narrative/Basis of Design	
Introduction:	The Basis of Design shall be a narrative presentation of facts that will clearly indicate the selected electrical, telecommuications, security, cable TV systems and/or the proposed alternative systems to be analyzed.
Primary Distribution:	Include the following: a. Describe the primary source of power. b. Where the source of power is located. c. Statement relative to the adequacy of the primary supply at the point of take-off. d. Electrical characteristics of power supply to station, or portion involved, including circuit interrupting and voltage regulation requirements. e. Estimate total connected load and resulting KVA demand load by applying proper demand (state operating assumptions) and diversity factors. f. Basis for selection of secondary voltage. g. Distribution (overhead or underground). h. Type of conductors, such as copper or aluminum. i. Type of conduit or duct, if used. j. A statement describing pertinent standards of design, such as voltage drop, physical characteristics of overhead or underground circuits, clearances, etc. k. A statement identifying ownership of transformers, switchgear and distribution system.
Primary Service Transformation to Secondary Service:	Include the following: a. Primary and secondary voltage rating. b. Describe the transformer or unit substation giving electrical characteristics. c. Describe the proposed primary and secondary switchgear. d. Describe the proposed primary and secondary protection devices.
Other Electrical Systems:	Describe the following: a. Lighting systems b. Power systems c. Emergency lighting d. Emergency power e. Grounding system or systems f. Telephone system g. Other systems such as television, paging, call, etc. h. Physical and electronic security features such as IDS, access control, tempest, etc.
Design Standards:	Provide a statement describing proposed pertinent standards of design, such as voltage regulation, lighting intensities, and type of lighting fixtures.

Drawings	
General:	Drawings: Electrical floor plans shall be not less than 1/8"=1'-0". Floor plan scales of 1/4"=1'-0" should be considered when the complexity of the work results in overcrowding of the drawings such as in electrical room layout.

Table 9.6 (Continued)	***Electrical Design Schematic Submittal Requirements***
Existing Site and Demolition Plan:	This plan should be developed to approximately 50% completion. Interior demolition should be shown on a separate plan.
Site Plan:	This plan should be developed to approximately 50% completion. Information on existing conditions should be complete and field checked.
Lighting Plan(s):	These plans should show a building's full floor plan (first, second, etc.) with the layout and type of fixtures to be used and the design footcandle levels for all types of lighting systems.
Power Plan(s):	These plans should show a building's full floor plan (first, second, etc.) with the location of receptacles, panelboards, switchboards, motor control centers, transformers and any other major equipment throughout the inside and outside of the building or project.
Single Line Diagram:	This drawing should be developed to approximately 50% completion showing all panels, switchboards, motor control centers, transformers and other major electrical loads such as M.G. sets, A/C chillers, etc.
Additional Plans/Risers	1) Telephone 2) IDS 3) Others as required 4) Public address system 5) Computer network

Calculations	
General	Provide calculations to back up sizing of major pieces of electrical equipment. The degree of completion shall be comparable to that of the narrative and drawings.

Specifications	
Outline Specifications	Outline specifications shall be developed per Appendix D.